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Optical studies of Pb2+ ions in a LiBaF3 crystal

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Abstract

The absorption and luminescence spectra of a LiBaF3:Pb 2+ crystal are studied in the temperature range 10-300 K. At 300 K a structureless absorption band (A band) is found in the energy range 1.4-6.6 eV. The luminescence spectra at 300 and 10 K are composed of two A′ and A1 bands with maxima at ~5.0 and ~4.0 eV, respectively. The A′ band originates from the 'regular' Pb2+ centres. The A′ band luminescence decay is single-exponential in the whole temperature range 10-300 K. The properties of the observed absorption and A′ luminescence bands are described well within the semiclassical theory based on the Franck-Condon principle and the Jahn-Teller effect in the excited sp configuration. The possible nature of the A1 band luminescence is discussed. © 2006 IOP Publishing Ltd.

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